Hammersmith & Fulham
Air Quality Annual Status Report for 2019
Date of publication: December 2019

This report provides a detailed overview of air quality in Hammersmith & Fulham during 2018. It has been produced to meet the requirements of the London Local Air Quality Management statutory process[1].

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[1] LLAQM Policy and Technical Guidance 2016 (LLAQM.TG(16)). https://www.london.gov.uk/what-we-do/environment/pollution-and-air-quality/working-boroughs

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Abbreviations

AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQO	Air Quality Objective
BEB	Buildings Emission Benchmark
CAB	Cleaner Air Borough
CAZ	Central Activity Zone
EV	Electric Vehicle
GLA	Greater London Authority
LAEI	London Atmospheric Emissions Inventory
LAQM	Local Air Quality Management
LLAQM	London Local Air Quality Management
NRMM	Non-Road Mobile Machinery
PM$_{10}$	Particulate matter less than 10 micron in diameter
PM$_{2.5}$	Particulate matter less than 2.5 micron in diameter
TEB	Transport Emissions Benchmark
TfL	Transport for London

Table A.   Summary of National Air Quality Standards and Objectives

Pollutant	Objective (UK)	Averaging Period	Date[1]
Nitrogen dioxide - NO_2	200 $\mu g\ m^{-3}$ not to be exceeded more than 18 times a year	1-hour mean	31 Dec 2005
	40 $\mu g\ m^{-3}$	Annual mean	31 Dec 2005
Particles - PM_{10}	50 $\mu g\ m^{-3}$ not to be exceeded more than 35 times a year	24-hour mean	31 Dec 2004
	40 $\mu g\ m^{-3}$	Annual mean	31 Dec 2004
Particles - $PM_{2.5}$	25 $\mu g\ m^{-3}$	Annual mean	2020
	Target of 15% reduction in concentration at urban background locations	3 year mean	Between 2010 and 2020
Sulphur Dioxide (SO_2)	266 $\mu g\ m^{-3}$ not to be exceeded more than 35 times a year	15 minute mean	31 Dec 2005
	350 $\mu g\ m^{-3}$ not to be exceeded more than 24 times a year	1 hour mean	31 Dec 2004
	125 $\mu g\ m^{-3}$ mot to be exceeded more than 3 times a year	24 hour mean	31 Dec 2004

Note: [1] by which to be achieved by and maintained thereafter

Figure A.   AQMA for NO$_2$ and PM$_{10}$ boundary (entire borough)

Legend

AQMA/Borough Boundary

1. Air Quality Monitoring

1.1 Locations

Table B. Details of Automatic Monitoring Sites for 2018

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance from monitoring site to relevant exposure (m)	Distance to kerb of nearest road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Monitoring technique
HF4	Shepherd's Bush	523313	179900	Roadside	Y	6	2	2	NO_2, PM_{10}	Chemiluminescent; TEOM

Note: A second automatic monitoring site was established within Hammersmith & Fulham in March 2019. Details of and results for the new Hammersmith Town Centre (HF5) monitoring site will be presented within the ASR for 2019.

Figure B.   Shepherds Bush Automatic Monitoring Site
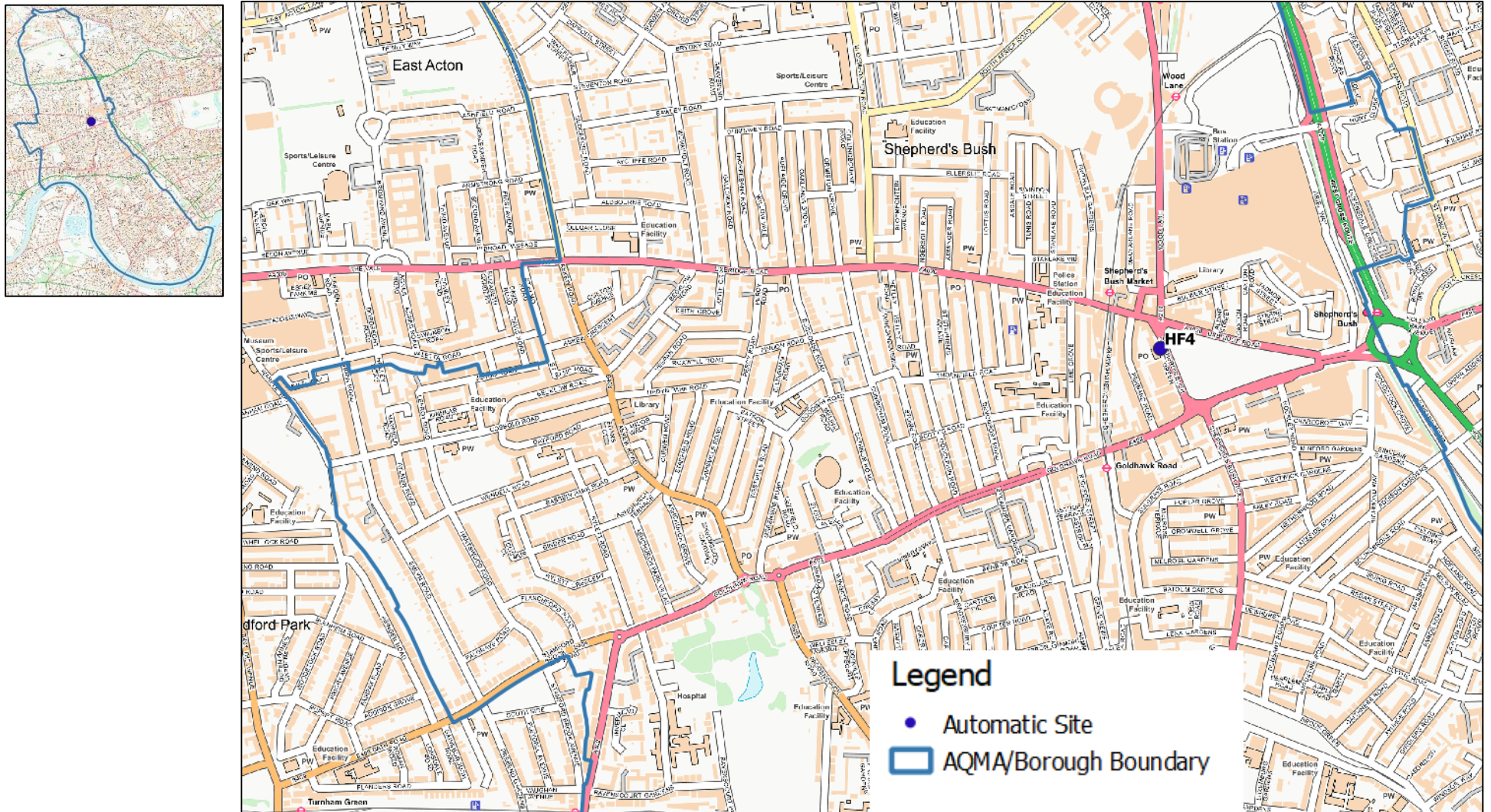
Table C.   Details of Non-Automatic Monitoring Sites for 2018

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance from monitoring site to relevant exposure (m)	Distance to kerb of nearest road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor? (Y/N)
HF01	Bagleys Lane	525760	176732	Roadside	Y	5	1	2.5	NO_2	N
HF02	Townmead Road	526146	176205	Roadside	Y	5	1	2.5	NO_2	N
HF03	Wandsworth Bridge Road	525819	175810	Roadside	Y	5	1	2.5	NO_2	N
HF04	Hugon Road	525652	175821	Urban Background	Y	3	1	2.5	NO_2	N
HF05	Fulham High Street	524406	175969	Roadside	Y	5	2	2.5	NO_2	N
HF06	New Kings Road	524846	176325	Roadside	Y	5	1	2.5	NO_2	N
HF07	Fulham Road	524633	176585	Roadside	Y	3	1	2.5	NO_2	N
HF08	Lysia Street	523595	177206	Urban Background	Y	5	1	2.5	NO_2	N
HF09	Paddenswick Road	522606	179008	Roadside	Y	5	1	2.5	NO_2	N
HF10	Brook Green Road	523856	178863	Roadside	Y	5	1	2.5	NO_2	N
HF11	Hammersmith Road	523436	178632	Roadside	Y	0	5	2.5	NO_2	N

HF12	Greyhound Road	524200	177875	Roadside	Y	5	1	2.5	NO_2	N
HF13	Hammersmith Bridge Road	523129	178331	Roadside	Y	9	3	2.5	NO_2	N
HF14	Kings Street	522777	178551	Roadside	Y	3	1	2.5	NO_2	N
HF15	Hemlock Road	522024	180896	Roadside	Y	5	1	2.5	NO_2	N
HF16	Wood Lane	523305	180176	Roadside	Y	5	1	2.5	NO_2	N
HF17	Conningham Road	522693	179595	Roadside	Y	5	1	2.5	NO_2	N
HF18	Goldhawk Road	522220	179281	Roadside	Y	5	1	2.5	NO_2	N
HF19	Askew Road	522006	179760	Roadside	Y	5	1	2.5	NO_2	N
HF20	Lefroy Road	521564	179685	Urban Background	Y	3	1	2.5	NO_2	N
HF 20/21/23	Shepherd's Bush AQMS	523313	179900	Roadside	Y	6	2	2.5	NO_2	Y – Triplicate co-location
HF24 (HF32)	Queen Caroline Street	523329	178484	Roadside	Y	5	1	2.5	NO_2	N
HF 25 (HF44)	Eel Brook Common	525386	176816	Urban Background	Y	45	32	2.5	NO_2	N
HF 26 (HF45)	Bryony Road	522480	180655	Urban Background	Y	8	1	2.5	NO_2	N
HF27 (HF47)	Wulfstan Street	522013	181106	Roadside	Y	3	1	2.5	NO_2	N

HF28 (HF48)	Lillie Road	524647	177657	Roadside	Y	3	1	2.5	NO_2	N
HF29 (HF50)	Fulham Broadway	525273	177273	Roadside	Y	3	4.7	2.5	NO_2	N
HF30 (HF53)	Addison Gardens	523801	179498	Urban Background	Y	5	1	2.5	NO_2	N
HF31 (HF54)	Bloemfontein Road	522550	180963	Roadside	Y	5	3	2.5	NO_2	N
HF32 (HF60)	Waldo Road	522550	182790	Urban Background	Y	4	1	2.5	NO_2	N
HF33 (HF61)	Uxbridge Road	522850	180060	Roadside	Y	3	1	2.5	NO_2	N
HF34 (HF62)	Cardross Street	522745	179179	Urban Background	Y	3	1	2.5	NO_2	N
HF35 (HF63)	Talgarth Road	524148	178358	Roadside	Y	5	1	2.5	NO_2	N
HF36 (HF64)	North End Road	524747	178158	Roadside	Y	3.73	1	2.5	NO_2	N
HF37 (HF65)	Fulham Palace Road	523926	176940	Roadside	Y	5	1	2.5	NO_2	N
HF38 (HF66)	Radipole Road	524680	176880	Urban Background	Y	5	1	2.5	NO_2	N
HF39	Butterwick (a)	523529	178470	Roadside	Y	5	1	2.5	NO_2	N

HF40	Butterwick (b)	523536	178448	Roadside	Y	5	1	2.5	NO_2	N
HF41	Butterwick (c)	523554	178444	Roadside	Y	11	1	2.5	NO_2	N
HF42	Shortlands (a)	523696	178642	Roadside	Y	9	11	2.5	NO_2	N
HF43	Shortlands (b)	523633	178446	Roadside	Y	9	3	2.5	NO_2	N
HF44	Shortlands (c)	523687	178446	Roadside	Y	11	3	2.5	NO_2	N
HF45	Shortlands (d)	523705	178448	Roadside	Y	10	3	2.5	NO_2	N

During 2018 a number of the diffusion tube monitoring sites have been re-named to provide consistency within the current network, where Site ID's have been updated the sites previous Site ID (as was presented within the 2018 ASR are provided in brackets). In addition to the 20 new diffusion tube monitoring sites that were introduced into the monitoring network within 2017, a further 7 diffusion tube monitoring sites have been added to the monitoring network within 2018 (HF39 – HF45).

Figure C. Non-Automatic NO₂ Monitoring Sites
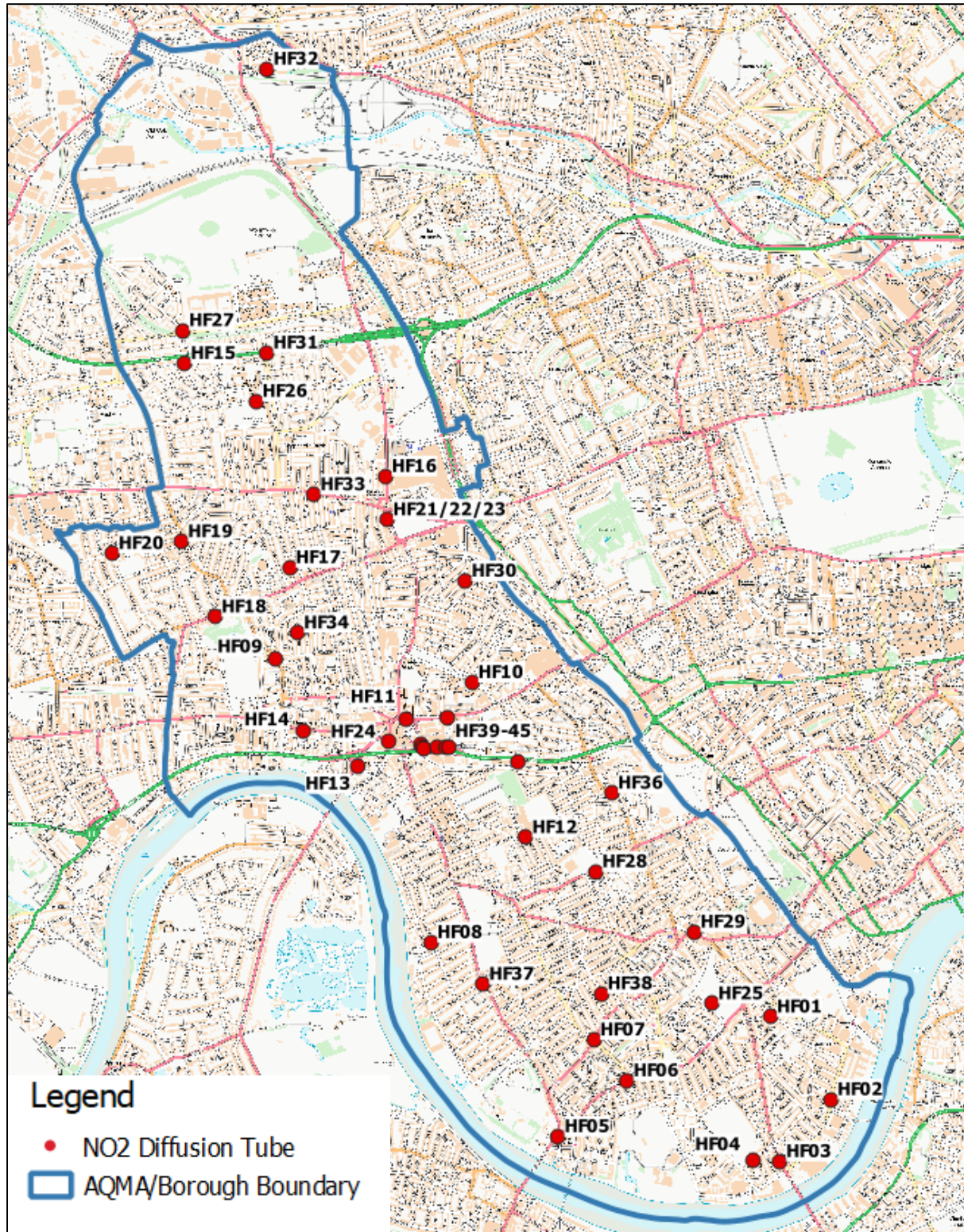
1.2   Comparison of Monitoring Results with AQOs

The results presented are after adjustments for "annualisation" and for distance to a location of relevant public exposure, the details of which are described in Appendix A.

Table D.   Annual Mean NO₂ Ratified and Bias-adjusted Monitoring Results (µg m⁻³)

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m⁻³) [c]							2018 Distance Corrected
				2012	2013	2014	2015	2016	2017	2018	
HF4	Automatic	86.4	86.4	**92.0**	**76.2**	**80.3**	**76.0**	**78.9**	**77.0**	**71.0**	**57.9**
HF01	DT	91.7	91.7	-	-	-	-	-	37.4	33.1	30.7
HF02	DT	83.3	83.3	-	-	-	-	-	**47.5**	**46.9**	**40.4**
HF03	DT	100.0	100.0	-	-	-	-	-	**87.1**	**74.3**	**56.2**
HF04	DT	100.0	100.0	-	-	-	-	-	30.0	27.6	-
HF05	DT	66.7	66.7	-	-	-	-	-	**54.3**	**53.1**	**44.6**
HF06	DT	100.0	100.0	-	-	-	-	-	**56.3**	**45.5**	38.1
HF07	DT	100.0	100.0	-	-	-	-	-	**61.0**	**53.4**	**45.5**
HF08	DT	100.0	100.0	-	-	-	-	-	27.9	27.1	-
HF09	DT	91.7	91.7	-	-	-	-	-	**44.4**	**42.2**	36.7

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3}) [c]							2018 Distance Corrected
				2012	2013	2014	2015	2016	2017	2018	
HF10	DT	100.0	100.0	-	-	-	-	-	35.7	32.0	
HF11	DT	91.7	91.7	-	-	-	-	-	**78.6**	**74.8**	**74.8**
HF12	DT	100.0	100.0	-	-	-	-	-	34.2	32.2	29.9
HF13	DT	91.7	91.7	-	-	-	-	-	**64.1**	**48.4**	**43.5**
HF14	DT	100.0	100.0	-	-	-	-	-	**60.1**	**51.9**	**45.7**
HF15	DT	100.0	100.0	-	-	-	-	-	35.1	31.1	30.2
HF16	DT	100.0	100.0	-	-	-	-	-	**58.9**	**51.5**	**44.1**
HF17	DT	100.0	100.0	-	-	-	-	-	**40.2**	35.3	32.3
HF18	DT	91.7	91.7	-	-	-	-	-	**60.8**	**49.3**	**41.2**
HF19	DT	100.0	100.0	-	-	-	-	-	**57.5**	**50.1**	**41.8**
HF20	DT	100.0	100.0	-	-	-	-	-	31.4	30.3	-
HF 20/21/23	DT	50.0 / 58.3 / 66.7 [d]	50.0 / 58.3 / 66.7 [d]	-	-	-	-	-	-	**64.4**	**53.4**

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3}) [c]							2018 Distance Corrected
				2012	2013	2014	2015	2016	2017	2018	
HF24 (HF32)	DT	100.0	100.0	<u>77</u>	<u>90.0</u>	<u>78.8</u>	<u>77.5</u>	<u>79.9</u>	<u>72.9</u>	<u>62.2</u>	**52.3**
HF 25 (HF44)	DT	100.0	100.0	35	37.9	29.6	28.5	32.7	31.9	26.2	-
HF 26 (HF45)	DT	91.7	91.7	36	**42.6**	35.1	34.1	39.6	36.7	31.2	-
HF27 (HF47)	DT	91.7	91.7	**41**	**49.7**	**46.0**	**45.4**	**46.9**	**46.6**	39.8	36.1
HF28 (HF48)	DT	75.0	75.0	-	**50.5**	**49.1**	**44.5**	**52.3**	**44.8**	**41.7**	37.3
HF29 (HF50)	DT	100.0	100.0	<u>71</u>	<u>75.3</u>	<u>65.0</u>	<u>60.3</u>	<u>68.3</u>	56.3	47.8	**44.9**
HF30 (HF53)	DT	91.7	91.7	36	**41.6**	32.5	32.6	38.2	**42.1**	31.5	-
HF31 (HF54)	DT	100.0	100.0	<u>77</u>	<u>98.4</u>	<u>80.7</u>	<u>76.6</u>	<u>84.3</u>	<u>76.8</u>	<u>68.1</u>	**58.1**
HF32 (HF60)	DT	100.0	100.0	-	**42.8**	39.2	37.6	**40.8**	**40.6**	34.5	-

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3}) [c]							2018 Distance Corrected
				2012	2013	2014	2015	2016	2017	2018	
HF33 (HF61)	DT	100.0	100.0	**43**	**50.1**	**45.8**	**45.9**	**49.4**	**42.6**	38.7	35.9
HF34 (HF62)	DT	91.7	91.7	-	34.7	31.8	30.7	34.4	37.0	27.4	-
HF35 (HF63)	DT	100.0	100.0	**56**	<u>**65.2**</u>	**56.1**	**49.8**	**59.8**	**50.9**	**47.4**	**42.0**
HF36 (HF64) [e]	DT	91.7	91.7	-	-	-	-	-	**58.8**	**54.2**	**47.4**
HF37 (HF65)	DT	100.0	100.0	-	<u>**63.6**</u>	**57.7**	**57.1**	<u>**68.6**</u>	**53.0**	**48.3**	38.6
HF38 (HF66)	DT	100.0	100.0	33	38.1	33.2	31.5	34.6	32.9	31.2	-
HF39	DT	91.7	91.7	-	-	-	-	-	-	<u>**69.4**</u>	**56.9**
HF40	DT	100.0	100.0	-	-	-	-	-	-	**57.1**	**49.0**
HF41	DT	100.0	100.0	-	-	-	-	-	-	**55.5**	**45.1**
HF42	DT	100.0	100.0	-	-	-	-	-	-	**50.0**	**46.4**

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3}) [c]							
				2012	2013	2014	2015	2016	2017	2018	2018 Distance Corrected
HF43	DT	91.7	91.7	-	-	-	-	-	-	**50.6**	**44.9**
HF44	DT	100.0	100.0	-	-	-	-	-	-	**51.0**	**44.5**
HF45	DT	100.0	100.0	-	-	-	-	-	-	**47.5**	**42.6**

Notes: Exceedance of the NO$_2$ annual mean AQO of 40 µg m^{-3} are shown in **bold**.

NO$_2$ annual means in excess of 60 µg m^{-3}, indicating a potential exceedance of the NO$_2$ hourly mean AQS objective are shown in **bold** and **underlined**.

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

[d] Data capture presented for each of the triplicate tubes

[e] HF36 was re-located during 2017, therefore results for HF36 at its previous location have not been presented

Charts are presented below to show the NO$_2$ annual mean concentrations across the seven year period as detailed in Table D above; Figure D presents annual mean concentrations at Roadside monitoring locations, and Figure E presents annual mean concentrations at Urban Background locations.

It can be seen that there has been a reduction in annual mean NO$_2$ concentration at every monitoring site across the borough. Across the diffusion tube monitoring sites this may partially be attributed to a lower bias adjustment factor being applied to the raw annual means than in previous years; the bias adjustment factor used to adjust the 2018 results was 0.98 calculated, as per previous years, from the co-located diffusion tube study completed at the North Kensington monitoring station. As can be seen within Table A.4, the 0.98 2018 factor is lower than the factor used by the borough for the previous six years. Bias adjustment is an important aspect of diffusion tube monitoring and all calculations, as detailed in Appendix A have been completed in line with LLAQM.TG(16)[1] guidance.

In addition to the reduction in NO$_2$ concentration experienced at all diffusion tube locations, there was a reduction in the annual mean NO$_2$ concentration experienced at the Shepherds Bush automatic monitoring site (HF4). The 71.0µg m^{-3} concentration monitored for 2018 was 6.0µg m^{-3} lower than the annual mean in 2017, and this is also the lowest annual mean recorded at HF4 for a period of seven years.

Figure D.   Annual Mean NO$_2$ Concentrations: Roadside Monitoring Locations
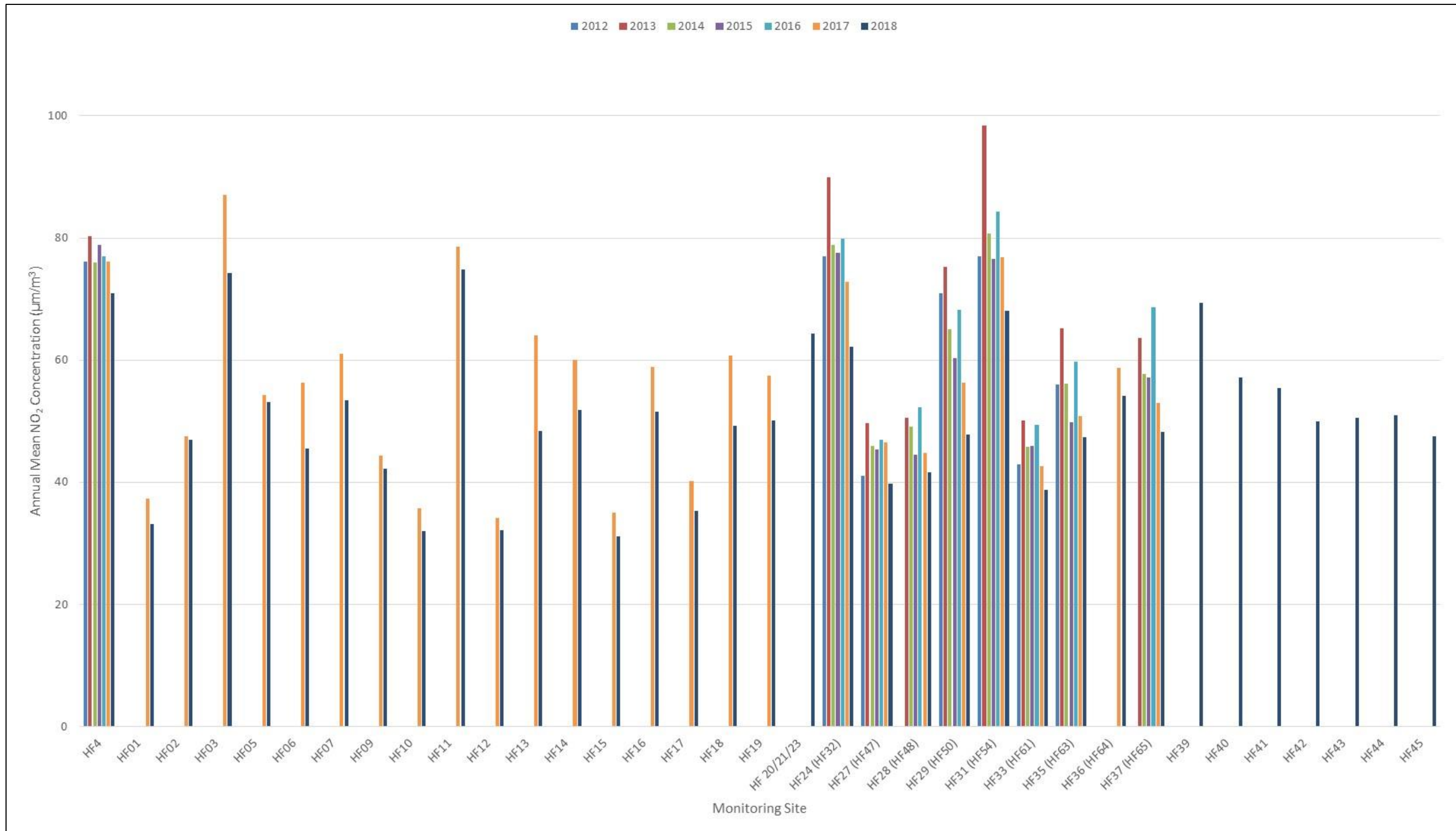
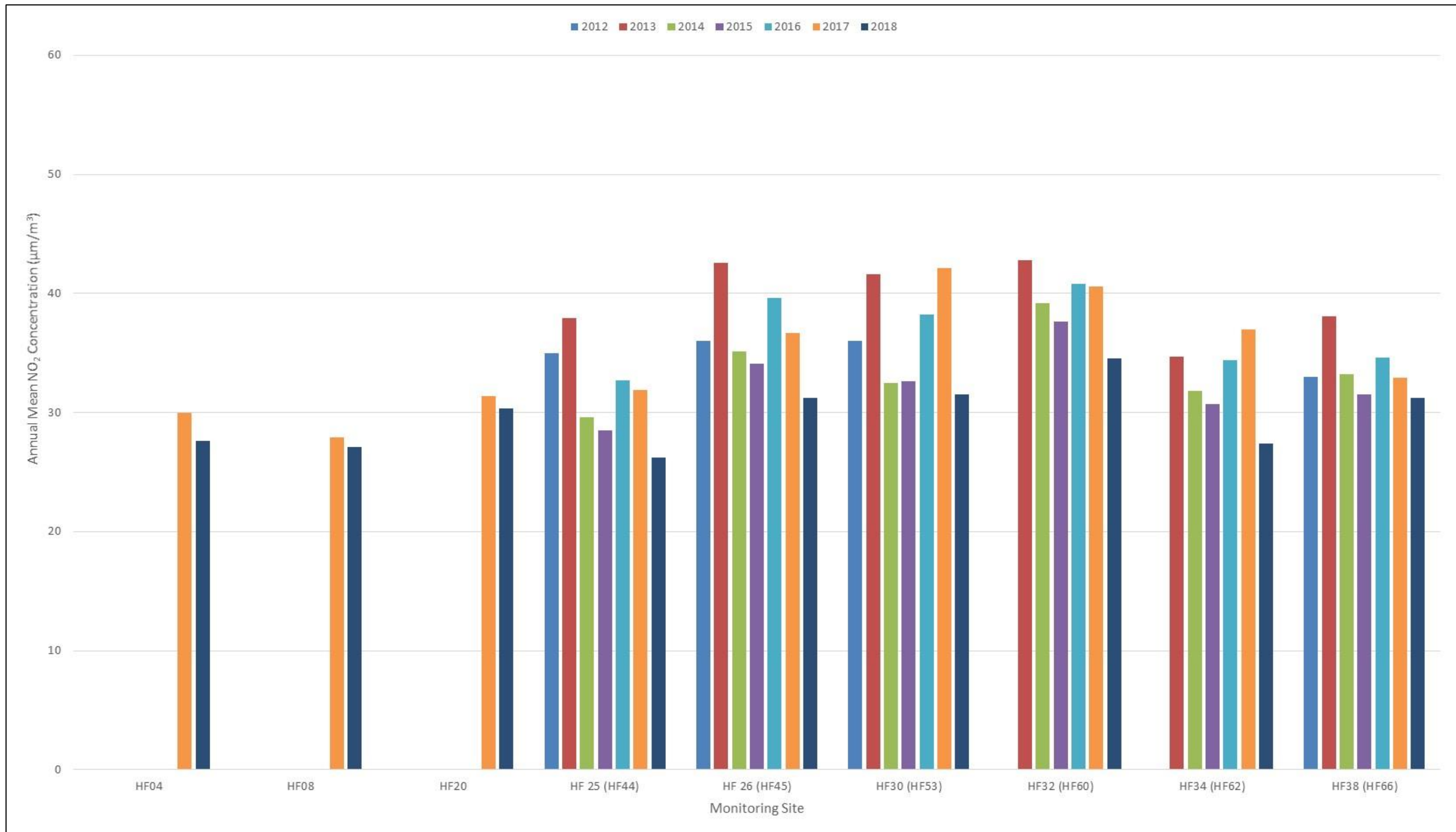**Figure E.** **Annual Mean NO$_2$ Concentrations: Urban Background Monitoring Locations**

Table E.   NO₂ Automatic Monitor Results: Comparison with 1-hour Mean Objective

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Number of Hourly Means > 200 µg m^{-3} [c]						
			2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
HF4	86.4	86.4	**74**	11(203.1)	0(179.1)	**19**	**33**	**20**	8

Notes: Exceedance of the NO₂ short term AQO of 200 µg m^{-3} over the permitted 18 times per year are shown in **bold**.
[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

The number of 1-hour NO₂ mean concentrations in excess of 200 µg m^{-3} during 2018 was recorded as eight, this is below the permitted number of exceedances (18) associated with the AQO. This is the first time that, where the NO$_x$ analyser has had a valid data capture (data capture was 53% in 2013 and 21% in 2014), that the monitoring site has been compliant with the 1-hour mean AQO. Figure F presents the number of 1-hour means in excess of the AQO since 2012, it can be seen that there has been a downward trend from 2012 to 2018. For 2013 and 2014 the actual number of 1-hour means in excess of the AQO have been plotted rather than the 99.8th percentile value, due to the data capture being low for these two years there may have been further exceedances experienced.

During 2012 there was a high degree of construction activity completed across two sites located in close proximity to HF4, the influence of site activities, stationary plant and NRMM influenced the 1-hour mean concentrations throughout 2012 resulting in the high number of 1-hour means in excess of the AQO. Due to the influence experienced at HF4 during 2012, and the low data capture at the site during 2013 and 2014 the trend representative of the true monitoring site conditions can only be analysed between 2015 and 2018. Between these years there is currently no clear long-term trend, an increase of the 2015 values was experienced in 2016 and 2017, with an overall reduction experienced between 2016 and 2018. Upon analysis of the 2019 monitoring data it will be assessed if this short-term downward trend is continued.

Figure F.   Number of NO$_2$ 1-hour Means > 200 µg m^{-3}
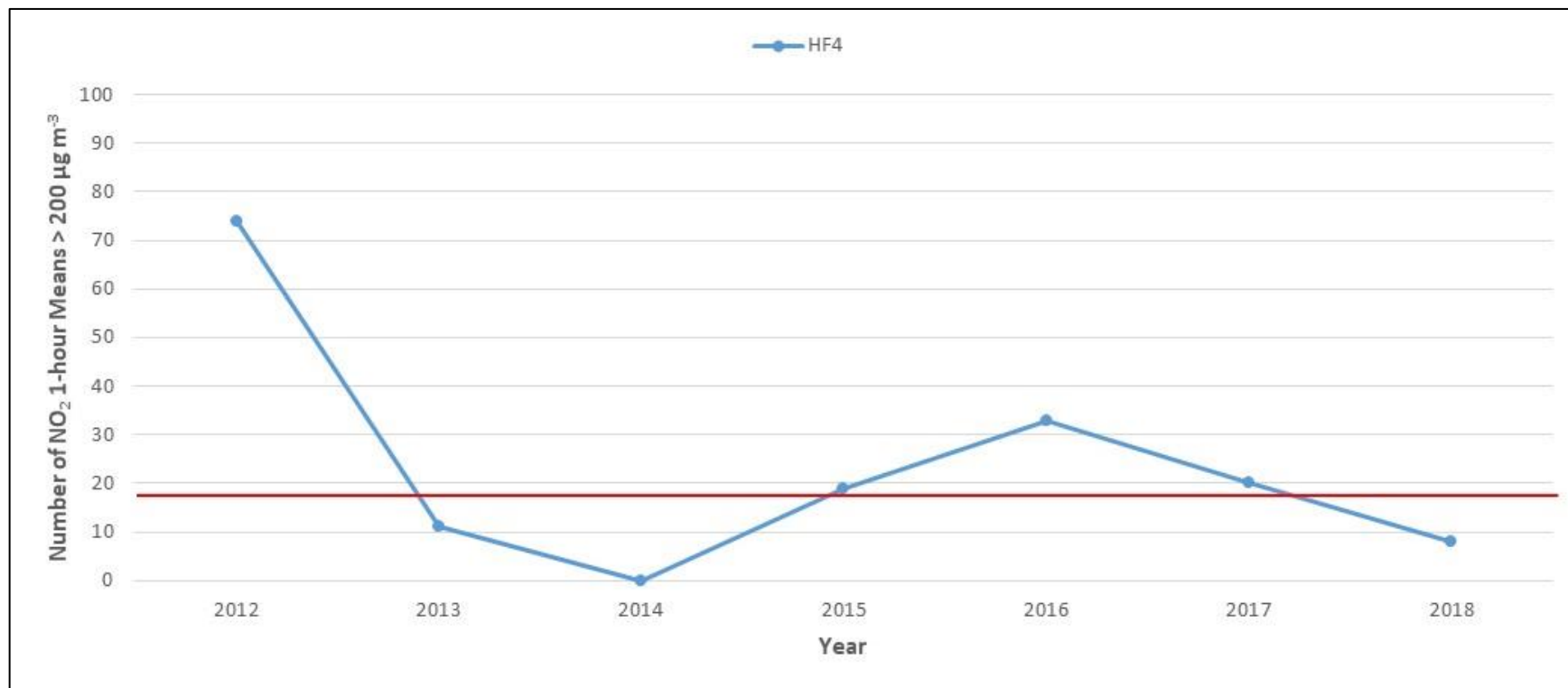
Note: Data capture for was less than 85% in both 2013 (53%) and 2014 (21%). The monitored number of 1-hour means in excess of 200 µg m^{-3} have been plotted rather than the 99.8th percentile value of 1-hour means.

Table F.   Annual Mean PM$_{10}$ Automatic Monitoring Results (µg m^{-3})

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3}) [c]						
			2012	2013	2014	2015	2016	2017	2018
HF4	85.3	85.3	38.0	36.4	26.5	25.0	27.4	38.0	26.4

Notes: Exceedance of the PM$_{10}$ annual mean AQO of 40 µg m^{-3} are shown in **bold**.

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

The annual mean concentration of PM$_{10}$ does not present a clear trend across the seven year period whereby monitoring data is presented for. The concentration ranges between a maximum of 38.0 µg m^{-3} in 2012 to a minimum of 25.0 µg m^{-3} in 2015, equating to a range of 13 µg m^{-3}. During the seven year period the AQO of 40 µg m^{-3} has not been exceeded, the 2018 annual mean concentration was 66% of the AQO.

Figure G.   Annual Mean PM$_{10}$ Automatic Monitoring Results
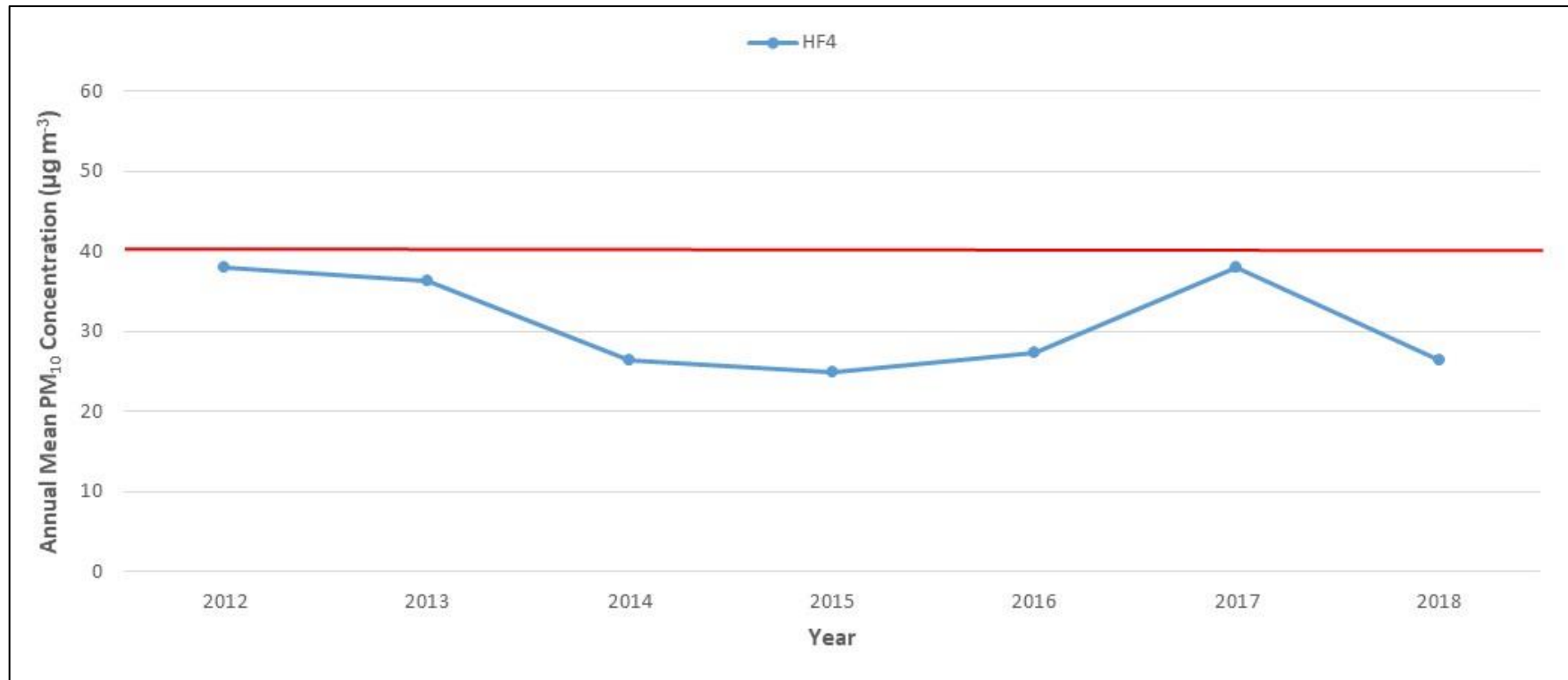
Table G.   **PM$_{10}$ Automatic Monitor Results: Comparison with 24-Hour Mean Objective**

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Number of Daily Means > 50 µg m^{-3} [c]						
			2012	2013	2014	2015	2016	2017	2018
HF4	85.3	85.3	67	33 (59.5)	0 (38.2)	10	17	14	4

Notes: Exceedance of the PM$_{10}$ short term AQO of 50 µg m^{-3} over the permitted 35 days per year or where the 90.4th percentile exceeds 50 µg m^{-3} are shown in **bold**.
Where the period of valid data is less than 85% of a full year, the 90.4th percentile is shown in brackets after the number of exceedances.
[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

The number of daily means in excess of 50 µg m^{-3} during 2018 was four, thus compliance with the short term PM$_{10}$ AQO was achieved. Notwithstanding years 2013 and 2014 where poor data capture was experienced, the compliance with the AQO has been achieved at HF4 for all years except for 2012 when there were 67 daily means in excess of 50 µg m^{-3}. There is an overall trend of decline between 2012 and 2018 due to the high number of exceedances experienced in 2012. For the past four years there is less of a clear trend with the number of exceedances ranging between 17 and four.

Figure H.   Number of PM_{10} Daily Means > 50 $\mu g\ m^{-3}$
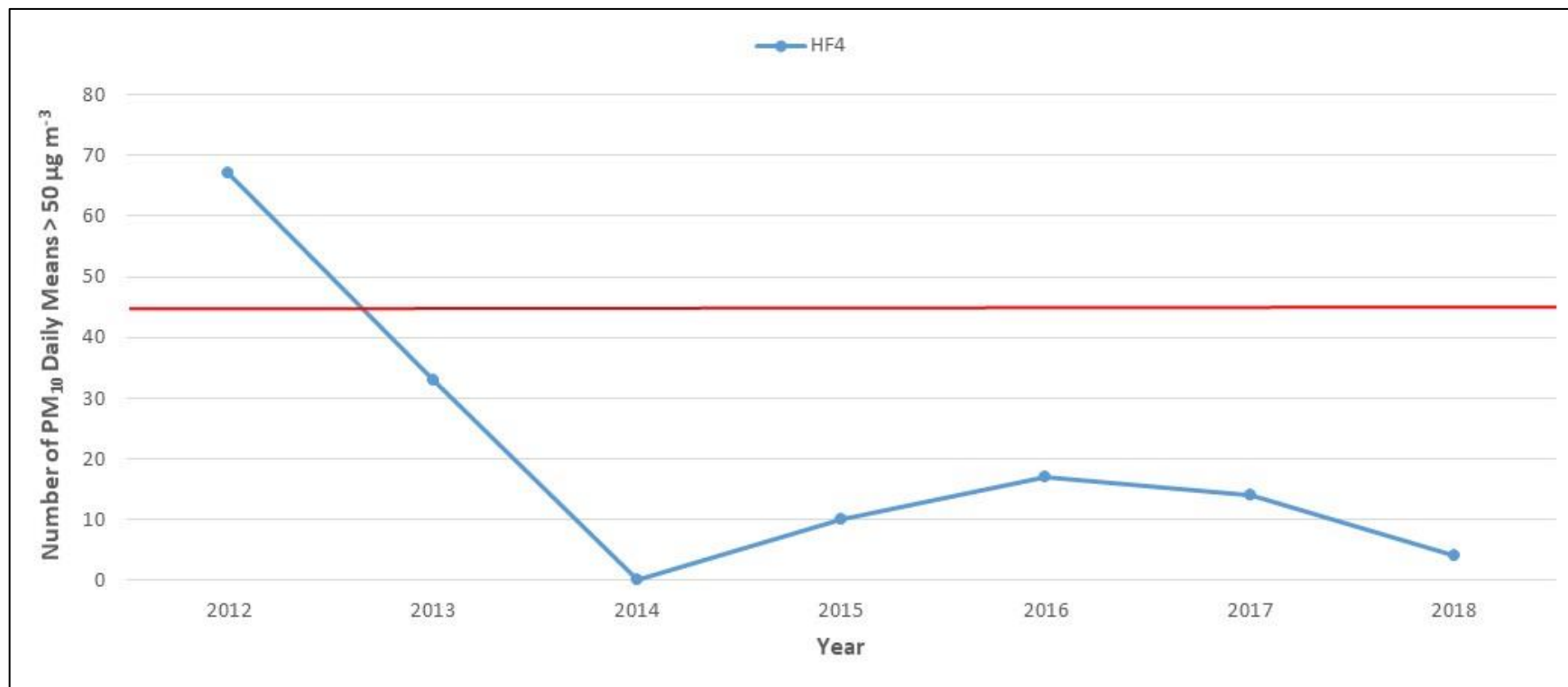
Note: Data capture for was less than 85% in both 2013 (44.9%) and 2014 (8%). The monitored number of daily means in excess of 50 $\mu g\ m^{-3}$ have been plotted rather than the 90.4 percentile value of daily means.

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2.   Action to Improve Air Quality

2.1   Air Quality Action Plan Progress

Table H provides a brief summary of the progress made by Hammersmith & Fulham against the Air Quality Action Plan, showing progress made this year.

Table H.   Delivery of Air Quality Action Plan Measures

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
Reducing Emissions at its source	*1. Encourage improved availability of alternative fuels*	a) The Council has 135 Source London on-street electric charging points. These points also accommodate fully electric BlueCity car club vehicles, which generated more than 10,000 activated sessions in H&F in 2018. b) The Council has installed the first multi-point rapid charge point (three) and more are planned, as well as single point rapids in other locations across the borough. Project with TfL ongoing. c) Supporting EV ownership growth in the borough the Council, working closely with residents, has installed 81 lamp column charge points for residential use. Work continues with monitoring and seeking further funding to further develop the network. d) Council policies require all new developments providing off street parking to provide a minimum of 25% active and 25% passive EV charging points.
Reducing Emissions at its source	*2. Provide incentives for use of alternative fuels*	Work has started on the introduction of emissions-based charges for on-street parking to further encourage the use of less polluting vehicles.

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		Free parking permits continue to be provided for fully electric vehicles in 2018.
Reducing Emissions at its source	*3. Promote travel plans to encourage a switch to low emission vehicles*	Workplace and school travel plans continue to be conditioned as part of the planning process. Westtrans monitoring officer continues to work one day a week to ensure work travel plan conditions are being complied with. As part of Hammersmith BID MAQF business LEN Project the Council engaged with businesses, on developing last mile zero emission delivery schemes which will be delivered in 2019. The Council in 2018/2019 bid to the Mayor's Air Quality Fund 3 for a Zero Emissions Network in Hammersmith Town Centre, travel and energy planning will be a core part of the strategy to help businesses in the area make more sustainable travel and energy choices.
Reducing Emissions at its source	*4. Reduce emissions from the Council fleet*	The Council has part of its procurement policies and procedures has adopted the use of the Low Emission Procurement Toolkit that was produced in May 2018 as part of the MAQF Low Emission Logistics project. An Options Report is to go to Political Cabinet in July 2019 to recommend various changes to the current collection of Waste and Recycling so that the future services can be designed to accommodate many of the air emission objectives as well as incorporating the low emission toolkit in the procurement of our waste collection service which is currently scheduled to finish in June 2021. The Councils waste contractors' fleet has implemented the following measures: • 5 Refuse Collection Vehicles have Euro VI engines • The mechanical Scarab sweeping fleet have all been replaced with Euro 6 engines '15 plate vehicles. • 20% of the fleet is ULEZ compliant.

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		• All Serco drivers of 7.5 tonne vehicles upwards, receive regular training for their CPC training. • SERCO are FORS accredited to Bronze standard. The Councils waste action team in June 2019 acquired an electric vehicle for their visits around the borough. This has replaced the smartcar which has been reallocated to the waste contracts team. There were no changes to the remainder of the Council fleet 2018. The Council offer monthly 'Dr Bike' sessions for their employees to encourage cycling which are well attended. Mayor's cycle hire pool access for Council staff also made available.
Reducing Emissions at its source	*5. Seek a reduction in emissions from the bus fleet*	TfL are introducing with the full support of the Council two low-emission bus corridors in the borough, Uxbridge Road and King Street/Hammersmith Road. All routes in the borough that operate into central London are now hybrid or electric. TfL with the Councils support also aspire to allow only electric buses to use Hammersmith Bridge when it reopens. The Council has been working with TfL on these projects, e.g. by changing waiting and loading restrictions to give priority to the low-emissions buses, and discussing with TfL what engineering works are necessary to enable electric buses to use Hammersmith Bridge. The Council work with the three football clubs in the borough (Chelsea, Fulham and QPR) to ensure idling from visiting coaches, etc. are dealt with by the clubs including deploying traffic stewards on match days in the local area where they speak to the drivers of the coaches if they leave their engines idling.

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
Reducing Emissions at its source	*6. Encourage the use of vehicles with smaller, more efficient engines*	The Council has started work on the introduction of emissions-based charges for on-street parking to deter car trips, particularly by the more polluting Non-Ultra Low Emission Zone (ULEZ) compliant vehicles.
Reducing Emissions at its source	*7. Seek to reduce emissions from larger vehicles (Low Emission Zone)*	A traffic restriction scheme was implemented in 2018 at the north end of Hammersmith Grove to narrow the entry, increase crossing space and make the road less attractive to through traffic, including heavy lorries. The Council commissioned West Trans as part of a West-London-wide project on Delivery Service Plans (DSP's) which started in 2017 and which aims to reduce the environmental and congestion impacts associated with freight activity. The Kings Mall was more recently identified as a site that was willing to engage and had enthusiasm for the project as part. Following analysis of the survey and questionnaire results, a series of potential DSP actions were reviewed. Below is a list of the 10 key actions that were included in the DSP Action Plan: 1) Produce suitable wording for lease / procurement / contract management documents notifying tenants and suppliers about the DSP and actions to reduce the impacts of freight. 2) Produce and maintain a list of suppliers and consolidate this list where feasible. 3) Require all suppliers to become FORS Accredited. 4) Where feasible, delivery and servicing companies to use walking porters, cargo bikes. and zero-emission vehicles for last mile deliveries. 5) Re-timing deliveries to off-peak periods and install safe and secure unattended delivery and storage facilities in the service yard.

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		6) Review access to the service yard. Enable vans to use both entry points instead of the current one-way arrangement. 7) Require all suppliers to use the service yard when making a delivery to the centre. 8) Install on-street signage to improve awareness of the yard's location and electric charging points for top-up charging. 9) Upgrade the servicing booking system to include delivery vehicles. 10) Consolidate the number of waste suppliers. The Council has implemented in 2018/2019 the DEFRA funded Clean Air Villages (CAV1) project in Fulham Town Centre and Shepherds Bush Town Centre. The work was undertaken by our project partner CRP with businesses and communities to make their deliveries and servicing more efficient and generate less air pollution, using both individual and collective action. For the Fulham CAV the solution was an on-line Ultra-Low Emission Supplier Directory (See https://crossriverpartnership.org/directory/villages/fulham-town-centre/) to showcase the number of suppliers in London who deliver across sectors on ultra-low emission vehicles. This will enable businesses to look at alternatives in their procurement stage and find all the information they need for switching suppliers. Within the first two weeks of the directory launch on the 14th May 2019, the webpages have been viewed 604 times with the Fulham Town Centre page being the most popular of the five directory pages. Based on local interest and working with the local Fulham BID, it is assumed that 8 local businesses will switch to directory suppliers in the first year.

Measure	Action	2018 Progress - Emissions/Concentration data - Benefits - Negative impacts / Complaints
		Two case studies were produced of the Anglo Consildates and First Mile companies of Ultra Low Emission Suppliers that are changing over to an electric fleet and serve the Fulham Town Centre. (See https://crossriverpartnership.org/wp-content/uploads/2019/06/CAV-LBHF-Anglo.pdf and https://crossriverpartnership.org/wp-content/uploads/2019/06/CAV-First-Mile-LBHF.pdf) For the Shepherds Bush CAV1 the solution was given the large number of hotels and pubs and bars just around the heavily congested green in the heart of Shepherds Bush, it was decided to focus on these to see whether there was potential to share suppliers coming into the area and consolidation and re-timing solution. Based on the engagement with the Shepherds Bush hotels, the following interventions were made: - The Dorsett hotel has mandated that stationary orders move from ad-hoc deliveries to once-a-week delivery and have confirmed the shared supplier has electric delivery vehicles for deliveries to their site. - All waste collection will be done towards the end of rush hour, over an hour later than their current times. - The hotels have spoken to their food supplier to both be on the same delivery run before the peak rush hour, further cutting congestion in the area. Annual emission percentage reduction as a result of the above interventions generated by deliveries to K West and Dorsett Hotels from suppliers were calculated to be 28% for NO_x, and 17% for PM_{10}. H&F were successful in their bids for DEFRA funding for CAV2 for Fulham and Shepherds Bush Town Centres for 2019/2020.

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		The MAQF Clean Air Better Business (CABB) project has resulted in the following measures. • OLYMPIA Exhibition Centre reduced delivery vehicles by more than a 100 a year by consolidating orders and changing suppliers. • The Hammersmith Apollo reduced delivery vehicles by 75 a year by consolidating suppliers and reducing the frequency of orders.
Reducing Emissions at its source	*8. Seek to reduce emissions from badly maintained vehicles*	The Council has implemented an experimental traffic order from November 2018 for 18 months which provides powers to traffic wardens to issue PCNs to drivers who are idling their engines in parking and loading bays, taxi ranks and any roads where waiting is restricted. The fine is £40 and increases to £80 when not paid within 14 days this has resulted in the following: • There are now 9 PCNs in our system. • In one case the driver drove away before the PCN could be served. • 5 have been paid without challenge. • 1 has been paid after a rejected challenge. • 1 is the subject of a current challenge. • The remaining 2 are outstanding.
Reducing Emissions at its source	*9. Encourage more environmentally friendly driving behaviour*	Since the confirmation of the 20mph limit, the Council have concentrated on implementing measures to ensure compliance at locations where there has been highest exceedance of the speed limit, where there is a continuing record of collisions, and where residents have complained. This work has mainly consisted in converting speed "cushions" to more effective sinusoidal humps. We are extending the 20mph limit a short distance in Uxbridge Road to cover a crossing to a school. The Council has been proactive in addressing emissions from idling vehicles, and during 2018 no vehicle-idling signs have been placed at approximately 250 key locations including Schools across the borough. There are

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		also plans in 2019 to erect no-idling signs outside all primary schools in the borough. The Council as part of the MAQF2 No-Idling project organised and implemented three vehicle idling action days during 2018, on clean air day with Hammersmith BID 20/06/2018, Family Day, Ravenscourt Park Community Festival 01/08/2019 and Car free day 20/09/2018). More than 100 members of the public were approached across the events. The Council will continue to participate in the three-year MAQF 3 No Idling project during the period 2019 to 2022.
Reducing Emissions at its source	*10. Seek a reduction in emissions of small particles from construction sites*	Complaints of dust nuisance investigated as and when reported. 53 complaints were received 2018/2019 about construction / demolition dust. Informal warning/advice is usually effective in securing improvements. The Council continues to require demolition and construction management plans for major development sites, including the submission of a AQDMP (Air Quality Dust Management Plan) that includes a dust risk assessment as well as measures to minimise dust emissions and are required to follow the London Mayor's "The Control of Dust and Emissions During Construction and Demolition SPG, 2014.' This includes the requirements to meet NRMM criteria. The Stage IIIB NRMM emission standard was required by planning condition on 65 sites during 2018. The Council as part of MAQF2 NRMM compliance project during 2018. 13 site Audits were undertaken, 2 sites were self-compliant, 10 sites worked towards and achieved Compliance and 1 site failed to achieve Compliance. The London Borough Hammersmith & Fulham achieved a Total Compliance status of 92%. The Council will continue to participate in the MAQF3 NRMM compliance project for the three year period from 2019 to 2022.

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		The council participated in the MAQF funded London Low Emission Construction Partnership (LLECP) project. This project included central London boroughs, the construction industry and their supply chain, low emission solution providers and King's College London The LLECP aim was to highlight the impact that the construction industry has on local air quality through dedicated outreach activities as well as encourage the uptake and test 'best in class' pollution reduction approaches with the participating construction sites including within Hammersmith & Fulham Council. As a result of the third and final year of the LLECP project a Best in Class' Guidance on Dust and Emissions from Construction document was produced and published in March 2019. This document provides an information resource for local authority staff working with the construction industry and should be considered alongside other guidance documents when considering how best to minimise emissions from this sector.
Reducing Emissions at its source	*11. Seek a reduction in emissions from domestic and commercial properties*	Policy CC1 of the Local Plan requires sustainable energy measures to be included in major developments and encourages these measures in all other developments. Minimising energy use helps to not only reduce CO_2 emissions from buildings but also other pollutants as well. On-site renewable energy use is also promoted in new developments and the most frequent technology deployed is PV panels and heat pumps which generate no local emissions. Use of Combined Heat and Power (CHP) units are only accepted where they can be used without having an unacceptable impact on air quality. From April 2018 to April 2019 there have been 3 bonfire complaints and 8 complaints received regarding smoke from commercial/domestic properties, these were addressed by the Council's Environmental Health team. Over last year The Council's Facilities Management contract with an external partner was brought back in house to have a better, more holistic control of how H&F corporate buildings are managed and maintained. This move will allow us to collect data on how buildings perform so that we may set targets and implement processes to save on energy usage and increase sustainability and implement relevant measures into our

Measure	Action	2018 Progress
		• Emissions/Concentration data • Benefits • Negative impacts / Complaints
		maintenance regimes. All our current civic estate had a full plant asset survey carried out to assess and build a profile of the buildings on its age of its internal assets, condition and provide the intelligence of where much needed upgrades were needed to increase the efficiency of the buildings. This allows us to profile buildings with regards to energy usage; all the major portfolio building has DECs renewed and EPCs carried out with full service advisory reports. Additionally, we also looked at water usage as previously most attentions went into energy and little was done on water and wastage. With that we have a contract with a new supplier now called Water Plus who started carrying out building audits to assess how we can save on water usage. Our Ethos focuses predominantly on upgrading aging plant and optimise heating and cooling systems as well as water waste to help reduce the energy demand and wastage by LBHF buildings without compromising thermal comfort, air quality or ambient lighting levels and other amenities. This is being incorporated into the yearly Corporate Planned Maintenance program to not just consider like for like replacement in breakdown and upgrade of its aging plant but to use the opportunity to consider more efficient options and assess what additional works can be done at same time which would bring back an acceptable payback of maximum 5 years. Thermal insulation and heat wastage is next on the agenda. The Council negotiated with the two allotment associations in the borough, including the 400+ plots at Fulham Palace, to establish limits on bonfire burning at these locations to Bonfire night week only as agreed with the respective association committee. Access to and collections of green waste provided in line with this to incentivise cooperation. Christmas tree recycling in late 2018/early 2019 = 72.24 tonnes. Our Residual waste per household per year (Kg) (kg/hh/yr) has again declined during the year ending 2018/19: • 2017/18 final = 419.61 kg/hh/yr • 2018/19 provisional = 403.43 kg/hh/yr

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		Less residual waste produced per household equals less waste collected and less waste incinerated. In 2018 in private homes 6 Ultra Low NO_x boiler, 1 window replacement, 4 heating controls were installed. The following energy efficiency and insulation measures were also implemented in 2018:

Measures installed	Total
radiator reflector panels	2
Tap aerators	1
LED - Bayonette	15
LED - Candle	0
LED - Screw (E27)	2
LED - GU10	0
Letterbox brush	2
Total no. of doors draught proofed	2
Total no. of windows draught proofed	6
Total no. of windows with secondary glazing film	1
Standby saver plug	0
Hot water tank jacket	0
Energy use monitor	0
Door brushes	1

Measure	Action	2018 Progress
		• Emissions/Concentration data • Benefits • Negative impacts / Complaints
Reducing Emissions at its source	*12. Seek to control and minimise emissions from industrial premises*	Regulation duties continued in line with the LAPPC requirements. No complaints were received in 2018/2019 regarding emissions from industrial sites regulated by the Council. No notices were served. Routine inspections also undertaken to ensure compliance with permits.
Reducing the Need to Travel	*13. Sustain and improve town & local centres, facilities and employment areas*	The majority of planning permissions and new commencements for major new development of homes and commercial floorspace has been in our town centres and areas of good public transport accessibility. One major exception was Olympia Exhibition Centre, however, this is an existing facility and the current levels of car parking are being reduced; a new contained logistics centre at basement level and major contributions to improve public transport. The 2018 Local Plan is still in place and policies are used to improve facilities etc in town centres and other locations in the borough which helps to reduce the need to travel. The Council's draft Local Implementation Plan for Transport was agreed by Cabinet in November 2018 and submitted to TfL, and the final version was approved by the Mayor of London in February 2019. Among the works undertaken in 2018 were: • The first phase of the Hammersmith Town Centre Business LEN scheme, including greening, increased space for pedestrians, less parking space for internal combustion engine vehicles, and electric vehicle charging points. • A scheme at the north end of Hammersmith Grove to narrow the entry, increase crossing space and make the road less attractive to through traffic, including heavy lorries. Further information can be found under Action 7.

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		• A programme of improvements in Bloemfontein Road, focussing on Green infrastructure including air quality improvements and sustainable urban drainage. • Initiated schemes to improve cycle safety and reduce rat running in the New King's Road area. • We built a new cycle path and footway across Brook Green. The LIP's key principles and projects include ensuring that sustainable modes (walking, cycling and public transport) are the main choice in the borough's regeneration areas, "Filtered permeability" in residential areas to prevent rat running and encourage walking and cycling, a TFK funded "Liveable Neighbourhoods project to reduce the dominance of motor traffic in North End Road, and longer term aspirations to replace Hammersmith Flyover with a tunnel, provide a new pedestrian/cycle bridge over the Thames at Imperial Wharf, and remove general traffic from the north side of Shepherds Bush Green.
Reducing the Need to Travel	*14. Seek to reduce the air quality impact of new development*	The 2018 Local Plan is still in place and policies are used to reduce the air quality impacts of new developments. The 2018 Local Plan is still in place and policies are used to reduce the air quality impacts of new developments. In 2018 the following number of sites were required to implement air quality mitigation via the development control process: 239 development sites with Mechanical Ventilation to reduce indoor exposure to poor air quality, 289 sites with Ultra Low NO_x Boilers, 18 sites with higher CHP emission standards, 65 sites with Air Quality Dust Management Plan (AQDMP) with stage IIIB NRMM emission standards (instead of the standard Stage lll, a greater London requirement) and the use of ULEZ compliant vehicles, 77 sites with Low Emission Strategies, 30 sites with stricter diesel emergency generator emission standards.

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		SPD Key Principle TR21 requires that all new developments that have the potential to have a detrimental impact during the demolition and construction phase will require a Construction Logistics Plan (CLP). The Council will apply a condition to the planning consent to ensure that a Construction Logistics Plan (CLP) and Demolition Logistics Plans(DLP) are submitted and approved before a planning permissions is implemented. The Construction Logistics Plan will be secured by condition or Section 106 agreement depending on the scale of the development. The Council's SPD requires that the CLP is in line with the Mayor's Construction Logistics Plan (2017) and requires how the development will: • Minimise the impact of construction traffic on nearby roads • Restrict construction trips to off peak hours only • Reduce the number of stationary vehicles on the highway and potential for idling vehicles, the need for control measures for stationary vehicles and potential idling.
Encouraging a Switch to Less Polluting Forms of Transport	*15. Promotion of bus services*	The bus network with the borough area remains stable, compared with cuts elsewhere in London. The Council has successfully lobbied TfL to improve the reliability of Route 266. They have agreed a plan to replace it with two new routes, whose implementation has been delayed due to the opening of the Elizabeth Line. The Council successfully campaigned to stop TfL from re-routing Bus 424, as this would have caused considerable hardship to people living in sheltered accommodation.

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
Encouraging a Switch to Less Polluting Forms of Transport	*16. Promotion of other forms of public transport*	Low emission bus corridors progressing, with several routes already converted to electric, hybrid or ULEZ compliant operation. The Council continues to lobby for Crossrail 2 to run via Sands End with an interchange station with the West London Line, and for an additional station on the West London Line at Hythe Road to serve the HS2/Elizabeth Line station and development in the OPDC area.
Encouraging a Switch to Less Polluting Forms of Transport	*17. Promotion of cycling*	Quietway 2 completed in 18/9. The Council has worked with TfL on Cycle way 9 and provided a consultation response for consultation on Cycle way 10. Cycle way 9 will start to be implemented in 2019 the first phase will see Hammersmith Town centre being transformed into a healthy street with the aim of encouraging our local residents to walk and cycle more to their local town centre. Please see action 19 for the Councils participation in the Urbanwise School Experts Travel sessions in which active travel (walking and cycling) is promoted to reduce vehicle emissions as a result of private car use on journeys to and from school. First batch of 11 secure on street "bikehangars" installed for residents who don't have space to park their bikes at home. 60 Sheffield Stands ("hoops") have been installed The Council has reached an agreement reached with TfL on Safe cycle path and Healthy Streets project for King Street/Hammersmith Road for less experience and local cyclists and A4 route for faster commuter cyclists.

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		Car Free day event held in Hammersmith Grove in September 2018, promoting walking, cycling and electric vehicles As part of the MAQF CABB project in 2018 an air quality and journey planner widget to promote active travel was produced for the H & F and can found on the Council website. (See https://www.lbhf.gov.uk/environment/pollution-and-air-quality/air-quality-forecast-and-cleaner-air-route-finder.
Encouraging a Switch to Less Polluting Forms of Transport	*18. Promotion of Walking*	Further traffic calming, and filtered permeability measures introduced in several roads, including Bishop King's Road, Colet Gardens, Auriol Road, Shorrolds Road, Burlington Road to help compliance with 20mph limits. 20mph one of the key factors in encouraging walking, by providing a less intimidating environment. Pedestrian crossings improved in Du Cane Road, Blythe Road and North Pole Roads. Scheme implemented to improve pedestrian facilities and prevent HGv's running through residential streets in Old Oak area. Walk on Wednesday scheme promoted in all schools. Please see action 19 for H& F participation in the Urbanwise School Experts Travel sessions in which active travel (walking and cycling) is promoted to reduce vehicle emissions as a result of private car use on journeys to and from schools. As part of the MAQF CABB project in 2018 an air quality and journey planner widget to promote active travel was produced for the H&F and can be found on the Council website. (See https://www.lbhf.gov.uk/environment/pollution-and-air-quality/air-quality-forecast-and-cleaner-air-route-finder).

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		Also as part of the MAQF CABB during 2018 four clean air walking routes were produced for walking routes within the borough. Air quality monitoring using high time-resolution black carbon monitors was undertaken on journeys along 'Standard routes' and 'Clean Air Walking Routes' in the borough. The results of this study were as follows: • Hammersmith Broadway Underground Station to Furnival Gardens: The results showed that black carbon concentrations along the 'Clean Air Walking Route' were, on average, 26.7 % lower than the 'Standard Route. • Barons Court Station to Charing Cross Hospital: The results show that black carbon concentrations along the 'Clean Air Walking Route' were, on average, 49.4 % lower than the 'Standard Route'. • Barons Court Station to Kensington Olympia: These results show that black carbon concentrations along the 'Clean Air Walking Route' were, on average, 54.8 % lower than the standard route. Hammersmith Station to Kensington Olympia station: These results showed that black carbon concentrations along the 'Clean Air Walking Route' were, on average, 27.9 % lower than the 'Standard Route.
Encouraging a Switch to Less Polluting Forms of Transport	*19. Encourage a reduction in car use for the journey to school*	838 children and 133 adults given cycle training during the year. 14 schools engaged with the Council and Urbanwise. London on environmental/travel projects. 16 schools engaged in the Bike-it projects with Sustrans - 12808 pupils present at 176 activities. (CB) Of the 81 schools in the Borough, 67 have undertaken their whole school travel surveys within the last 2 years, and under the TfL STARS (Sustainable Travel: Active Responsible Safe) accreditation scheme, the following levels were awarded in September 2017:

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		• 25 engaged, 6 Gold, 11 Silver, 20 Bronze Council officers from Environmental Quality Team, Transport Officers. Road Safety and SUSTRAN bike officers attended f 15 Urbanwise School Travel Expert sessions with schools across the borough. This involved discussing the results of the students travel projects and answering any question in respect to air quality. The work also included the promotion of the positive health impacts of low pollution routes to schools by using the walkit.com and active travel (walking and cycling) instead of travelling to school by private vehicles. As part of the MAQF School Air Quality Programme audits were conducted at and St Pauls CofE Primary School and Melcombe Primary School. The recommendation provided in reports issued in May 2018 and green infrastructure installed on the site boundaries at both schools.
Encouraging a Switch to Less Polluting Forms of Transport	*20. Encourage a reduction in car use for the journey to work and business trips*	The Council continue to require Workplace travel plans continue by planning condition for any new developments via Planning. Workplace travel plans promoted as part of the Healthy Workplace Charter Programme by Council's Healthy workplace business advisor. If the workplace was a school this was referred to the Hammersmith and Fulham School Travel Advisor, Westtrans has continued to work with businesses to develop workplace travel plans as part of this programme which was not obliged to have workplace travel plan for planning condition Further information can be found regarding the MAQF CABB Clean Air Walking Routes under Action 18 The Council bid to the Mayor's Air Quality Funding 3 for a Zero Emissions Network in Hammersmith, travel and energy planning would be a core part of the strategy to help businesses in the area make more sustainable travel and energy choices.
Encouraging a Switch to Less	*21. Control provision of on and off street parking to deter car commuting*	On-street parking charges were increased by 10% in April 2019 in response to several years of frozen charges and in response to relative low charge compared to other London boroughs. Work has started on the introduction of emissions-based charges for on-street parking to deter car trips, particularly by more

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
Polluting Forms of Transport	*into and within the borough*	polluting vehicles. The Council continues implementing parking controls on housing estates in the borough to remove availability of uncontrolled publicly accessible urban parking areas. 35% of the Council Housing states have controlled parking traffic orders to remove availability of uncontrolled publicly accessible urban parking areas. However, 27 of the top 30 largest estates in the borough are under controlled parking traffic orders. Most of the smaller estates that are not currently under controlled parking traffic orders have a greatly reduced number of dwellings and parking spaces, hence an alternative method of parking control was implemented such as gates and bollards etc.
Encouraging a Switch to Less Polluting Forms of Transport	*22. Encourage freight to be transported in a sustainable manner*	Further information can be found in respect to reducing vehicle emissions from freight in for MAQF CABB, DEFRA CAV1 and Kings Mall projects as detailed in Action 7 The Council has continued working with the Hammersmith BID and Westtrans to introduce a zero emission last mile delivery freight scheme in Hammersmith Town Centre and the Kings Mall shopping centre.
Make a More Efficient Use of Road Transport	*23. Encourage car sharing*	The Council continue to actively work with car club operators - Zipcar and City Car Club - to develop their existing on-street network. There are currently 49 bays. We also are the leading borough for the fully electric vehicle BlueCity car club operating from source London charge points, which in 2018 had over 10,000 activated sessions in H&F. The Council bid for Mayor's Air Quality Funding 3 for a Zero Emissions Network in Hammersmith, travel and energy planning which would be a core part of the strategy to help businesses in the area make more sustainable travel and energy choices.

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		The Council is currently developing proposals for floating car clubs, with the emphasis on electric cars.
Make a More Efficient Use of Road Transport	*24. Discourage short journeys*	Five Controlled Parking Zones were reviewed, and controls strengthened in those zones where residents voted for this. Sub zones created where vote is split. Active and sustainable travel promoted using the MAQF CABB clean air walking route planner and the Walkit com website as detailed in Action 18.
Other Measures to Reduce Road Traffic Emissions	*25. Reduce the amount of road traffic in residential areas and town centres*	The Council continues to require Travel plans for developments to reduce use of private cars and their associated emissions. Developments in areas well connected by public transport are expected to be car-free, with no parking provided, other than for disabled people. Where appropriate and in accordance with the aims of the London Plan the Council also encourages the provision of car club bays, especially those with restricted parking. Planning policies also require electric vehicle parking spaces for both residential and commercial uses – e.g. the requirement for residential developments is that 20% of all spaces must be for electric vehicles with an additional 20% passive provision for electric vehicles in the future. Cycling and walking are also encouraged by planning policies which require improvements to the environment and provision of facilities such as cycle parking and provision of support for cycle hire schemes. Working with residents in Brackenbury, Hammersmith, the Council has launched a collaborative consultation using Commonplace to identify traffic and air quality issues in the area. Using this information, plus work undertaken by residents, a template 'low traffic neighbourhood' programme of interventions will be

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		developed that can be used in other areas to reduce the amount of road traffic. The Council has implemented Traffic Management Schemes to reduce through traffic in Hammersmith Grove, several roads, including Bishop King's Road, Colet Gardens, Auriol Road, and Shorrolds Road The Council has implemented traffic schemes to reduce through traffic in Hammersmith Grove, including a ban on HGV traffic (except for access). The Council as part of the MAQF2 project for Hammersmith Grove in Hammersmith Town Centre has installed award winning parklets that have, replacing a number of car parking spaces, green infrastructure, cycle parking and electric vehicle charging points.
Other Measures to Reduce Road Traffic Emissions	*26. Promote the use of trees to help improve local air quality*	In 2018/19 the Council planted 20 new street trees and replaced 120 street trees. 6 replacement trees went in on housing land. 242 Trees planted in Parks, Open Spaces and Cemeteries across the borough in 2018/19. The Resident led Air Quality Commission in LBHF asked the Council to alternate pruning to ensure as much green cover as possible. The Council have now designed a pruning programme to begin on 2 busy streets, Shepherd's Bush Road and Hammersmith Grove where pruning will be on 50% of trees in 2019/2020, 50% in 2020/2021 and then begin a three-year cycle. A three-year cycle will also be progressed on Wansdworth Bridge Road where were all trees were pruned this in 2019 due to structural and other issues. Footpath improvements in a SUDS compliant material at Brook Green, St Mary's church and Furnival Gardens.

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
Other Measures to Reduce Road Traffic Emissions	***27. Reduce the amount of traffic on the A4 and A40***	Hammersmith Residents' Working Party has assisted officers in producing a masterplan for a draft Hammersmith Supplementary Planning Document a key element of which is a flyunder. The aim is to undertake a public consultation later this year (2019) and adoption while continuing to lobby the Mayor and TfL for support. Work is progressing on developing a Masterplan and Supplementary Planning Guidance document for Hammersmith which includes the objective of promoting the replacement of the flyover and section of the A4 with a tunnel (flyunder). The proposed redesign of the Hammersmith gyratory would promote pedestrian movement in the town centre without unacceptable traffic and environmental costs. TfL reached an agreement with the Council for a cycle route alongside the A40, The Council undertook further studies on the flyunder and have asked TfL to introduce a surface level crossing of the A4 by Hammersmith Town Hall, with a concomitant speed reduction.
Raise Awareness of the Links Between Air Quality and Health	***28. Provide information to allow people to make informed choices about travel behaviour***	The Council continue to support AirTEXT and promote it to the public on our website and at events. There were 17 additional subscribers to airTEXT pollution alerts from April 2018. The majority of these subscribers receive alerts by text message (185 people) and 20 voicemail subscribers. AirTEXT and the clean air route planner and AQ forecast widget are promoted on the Councils website (See https://www.lbhf.gov.uk/environment/pollution-and-air-quality/air-quality) On Clean Air Day June 2018 the Council with Hammersmith BID as part of Clean Air day event in Lyric Square had an air quality stall to provide information and advice to visitors on the sources of pollution and how visitors and residents can contribute to improving air quality in the borough and reducing their exposure to poor air quality Public Health department are undertaking programme of media briefings air quality awareness and ways of

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		people accessing these will be a part of this, and we will extend this to information about domestic air pollution.
Raise Awareness of the Links Between Air Quality and Health	***29. Provide information so people can make informed choices about reducing pollution from domestic activities***	The Council Housing department will continue to work with colleagues in Resident services to make available to residents information via a number of different means (letters, estate notice boards and resident meetings) about improvements that can be made to improve air quality. On Clean Air Day June 2018 the Council with Hammersmith BID as part of Clean Air day event in Lyric Square had an air quality stall to provide information and advice to visitors on the sources of pollution and how visitors and residents can contribute to improving air quality in the borough and reducing their exposure to poor air quality.
Raise Awareness of the Links Between Air Quality and Health	***30. Continue to monitor air quality and make info. available***	Real time monitoring for NO_2 and PM_{10} has continued at Shepherds Bush Green (HF4) continuous air quality monitoring station. A new continuous air quality monitoring station was installed at Hammersmith Town Centre (HF5) in 2019 , as near as possible to the location of the previous monitoring station in Hammersmith Broadway which was closed in 2008. The new HF5 station became operational on 5th March 2019 and includes reference compliant equipment that monitors and measures the air pollutants Nitrogen Dioxide (NO_2), Particulates ($PM_{2.5}$, PM_{10}) and Ozone (O_3). HF5 will provide information on the impacts of transport network changes planned in the area including the ULEZ extension into the borough in October 2021 to advise on future measures to reduce pollution. This new station also intends to provide information on the impact on ozone formation from the actions to reduce NO2 emissions. Live access to the real time air quality monitoring stations is available on-line (See

Measure	Action	2018 Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		https://www.airqualityengland.co.uk/local-authority/?la_id=195) and links to this are provided on the Council website (See https://www.lbhf.gov.uk/environment/pollution-and-air-quality/air-quality. The diffusion tube network across the borough has been maintained. Data is made available on the Council website as part of the Annual Status Reports once annual adjustments are undertaken. (See https://www.lbhf.gov.uk/environment/pollution-and-air-quality/air-quality).

3. Planning Update and Other New Sources of Emissions

Table I. **Planning requirements met by planning applications in Hammersmith & Fulham in 2018**

Condition	Number
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	28
Number of planning applications required to monitor for construction dust	63
Number of CHPs/Biomass boilers refused on air quality grounds	0
Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions	14
Number of developments required to install Ultra-Low NO$_x$ boilers	14
Number of developments where an AQ Neutral building and/or transport assessments undertaken	113
Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	44
Number of planning applications with S106 agreements including other requirements to improve air quality	0
Number of planning applications with CIL payments that include a contribution to improve air quality	0
NRMM: Central Activity Zone and Canary Wharf Number of conditions related to NRMM included. Number of developments registered and compliant. Please include confirmation that you have checked that the development has been registered at www.nrmm.london and that all NRMM used on-site is compliant with Stage IIIB of the Directive and/or exemptions to the policy.	N/A
NRMM: Greater London (excluding Central Activity Zone and Canary Wharf) Number of conditions related to NRMM included. Number of developments registered and compliant. Please include confirmation that you have checked that the development has been registered at www.nrmm.london and that all NRMM used on-site is compliant with Stage IIIA of the Directive and/or exemptions to the policy.	*65 conditions included (planning condition is for the more stringent plant limits set for CAZ and Canary Wharf) 13 registered and compliant (2 of these were self-compliant) 1 uncompliant and being chased.*

3.1 New or significantly changed industrial or other sources

There have been no new, or significantly changed industrial or other sources identified within the borough during 2018.

Appendix A   Details of Monitoring Site QA/QC

A.1   Automatic Monitoring Sites

Data management and Local Site Operator (LSO) duties for Hammersmith & Fulham's automatic monitoring station have been completed by Ricardo Energy and Environment since November 2017. All real-time data from the monitoring station is independently collected and validated on a daily basis. A combination of automatic and manual checks is used to assess data, identify and diagnose potential equipment faults and adjust data to take account of calibration tests. Automatic overnight calibrations are supplemented with regular manual calibrations of analysers. The procedures used conform to the EU standards that are a requirement of the AURN.

All data is formally ratified and is available is available online by accessing the Air Quality England Website and selecting Hammersmith & Fulham within the 'Select local authority' menu bar. During this process the validation decisions can be ratified with the benefit of hindsight and using greater information, such as service records, calibration records and the results of station audits. Station audits are carried out by Ricardo Energy and Environments in house audit team.

PM$_{10}$ Monitoring Adjustment

All PM$_{10}$ data presented in this report has been corrected to gravimetric equivalent using the Volatile Correction Model (VCM). The application of the VCM to the raw data is completed by Ricardo Energy and Environment through the current data management contract, therefore this is also true of any data that is presented on the Air Quality England website.

A.2   Diffusion Tube Quality Assurance / Quality Control

The diffusion tubes for the year 2018 were supplied and analysed by Gradko International, with the 50% Triethanolamine (TEA) in acetone preparation method utilised. Gradko is a UKAS accredited laboratory that follows the procedures set out by Defra within Diffusion Tubes for Ambient NO$_2$ Monitoring: Practical Guidance for Laboratories and Users, and strict internal QA/QC procedures to ensure that concentrations reported are as accurate as possible. In addition Gradko participate in two independent QA/QC schemes to ensure their performance is constantly independently reviewed.

1) AIR-PT

AIR is an independent proficiency-testing (PT) scheme that is operated by LGC standards and supported by the Health and Safety Laboratory (HSL). AIR-PT began in April 2014 and combined two long running PT schemes: LGC Standards STACKS PT scheme, and the HSL WASP PT scheme. AIR is a recognised performance-testing programme for labs undertaking NO$_2$ diffusion tube analysis as part of a wider UK NO$_2$ monitoring network. The AIR-PT results for Gradko during 2018 are presented in Table A.1 below, it can be seen that a 100% result was achieved for all monitoring samples provided.

Further information on proficiency testing can be found at Defra's Local Air Quality Management webpages under QA/QC framework for NO$_2$ diffusion tube monitoring.

Table A.1   Gradko Performance within AIR-PT for NO$_2$ Diffusion Tubes – 2018

AIR PT AR024	AIR PT AR025	AIR PT AR027	AIR PT AR028
January – February 2018	April – May 2018	July – August 2018	September – October 2018
100%	100%	100%	100%

2) Network Field Inter-Comparison Exercise

Gradko International also takes part in the NO$_2$ Network Field Inter-Comparison Exercise, operated by the National Physical Laboratory (NPL), which complements the AIR-PT scheme in assessing sampling and analytical performance of diffusion tubes under normal operating conditions. This involves the regular exposure of a triplicate set of tubes at an Automatic Urban Network site (AURN) site where continuous chemiluminescent analysers measure NO$_2$ concentrations.

The inter-comparison exercise is completed at the Marylebone AURN monitoring station. Of particular interest is the bias of the diffusion tube measurement relative to the automatic analyser that gives an indication of accuracy. Performance criterion have been established for participating laboratories in line with the Air Quality Directive 2008/50/EC requirement for indicative monitoring techniques, as the 95% confidence interval of the annual mean bias which should not exceed ±25%.

In conjunction with this, a measure of precision is determined by comparing the triplicate co-located tube measurements, commonly referred to as the coefficient of variation (CoV). This value is useful for assessing the uncertainty of results due to sampling and analytical techniques. The NPL performance criterion for precision is that the mean coefficient of variation for the full year should not exceed 10%, should this be achieved the precision is given a score of 'good'.

Gradko operates well within the required level of performance in terms of accuracy and precision, as shown by the results presented in Table A.2 below.

Table A.2   Gradko NO$_2$ Network Field Inter-Comparison Results for 2018

Annual Mean Bias		Precision	
Performance Target	Gradko Annual Mean Bias	Performance Target	Gradko Precision
±25%	+ 6.5%	10%	Good

Factor from Local Co-location Studies

Hammersmith & Fulham are part of the London Wide Environmental Programme (LWEP) for which a number of co-location studies are completed across seven London Boroughs. During 2018 triplicate diffusion tube monitoring was completed at the HF4 automatic monitoring station, and the co-location results were preliminary included within the LWEP bias adjustment calculations. Due to a calculation of overall poor data capture across the diffusion tube and automatic monitoring results, as shown in Figure A.1, the bias adjustment factor calculated at HF4 was not included within the overall average LWEP bias adjustment factor calculations.

Figure A.1 HF4 Bias Adjustment Factor Calculations

Checking Precision and Accuracy of Triplicate Tubes
AEA Energy & Environment — From the AEA group

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm⁻³	Tube 2 µgm⁻³	Tube 3 µgm⁻³	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	02/01/2018	01/02/2018								69.665	100		Good
2	01/02/2018	27/02/2018		54.02	55.49	55	1.0	2	9.3	71.6062	99.358974	Good	Good
3	27/02/2018	26/03/2018		58.23						66.0822	99.382716		Good
4	26/03/2018	01/05/2018	68.45		64.35	66	2.9	4	26.1	74.3734	98.726852	Good	Good
5	01/05/2018	07/06/2018	64.96		63.87	64	0.8	1	6.9	77.0229	99.774775	Good	Good
6	07/06/2018	05/07/2018	47.43	56.38	56.45	53	5.2	10	12.9	65.599	99.404762	Good	Good
7	05/07/2018	31/07/2018		76.88						67.1585	97.115385		
8	31/07/2018	05/09/2018	68.98	68.67	72.59	70	2.2	3	5.4	62.4906	56.25	Good	Poor Data Capture
9	05/09/2018	03/10/2018	62.45	64.76	56.67	61	4.2	7	10.4	75.8296	30.059524	Good	Poor Data Capture
10	03/10/2018	31/10/2018		58.75	64.23	61	3.9	6	34.8	72.3041	99.404762	Good	Good
11	31/10/2018	04/12/2018	62.93		57.46	60	3.9	6	34.8	65.4822	99.632353	Good	Good
12	04/12/2018	08/01/2019			65.50					68.6772	99.880952		Good
13											83.915921		Good

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Overall survey --> Good precision | Poor Overall (Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision   8 out of 8 periods have a CV smaller than 20%

Accuracy   (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 6 periods of data
Bias factor A   1.18 (1.12 - 1.25)
Bias B   -15%   (-20% - -11%)
Diffusion Tubes Mean: 60 µgm⁻³
Mean CV (Precision):   5
Automatic Mean: 71 µgm⁻³
Data Capture for periods used: 99%
Adjusted Tubes Mean: 71 (67 - 75) µgm⁻³

Accuracy   (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 6 periods of data
Bias factor A   1.18 (1.12 - 1.25)
Bias B   -15%   (-20% - -11%)
Diffusion Tubes Mean: 60 µgm⁻³
Mean CV (Precision):   5
Automatic Mean: 71 µgm⁻³
Data Capture for periods used: 99%
Adjusted Tubes Mean: 71 (67 - 75) µgm⁻³

Jaume Targa, for AEA
Version 04 - February 2011

Table A.3 Bias Adjustment Factor and % Bias of all LWEP Monitored Co-Location Studies 2018

London Borough	Site Location	Diffusion Tube	Continuous Analyser	Correction Factor (A)	% Bias based on continuous monitor (B)
Kensington	North Kensington	28.2	27.6	0.98	2
Kensington	Cromwell Road	58.4	47.5	0.83	20
LWEP	Bloomsbury	40.5	36.6	0.90	11
Croydon	Park Lane	55.8	41.3	0.74	35
Croydon	London Road	57.2	49.0	0.87	15
Greenwich	Eltham	20.4	17.6	0.87	16
Greenwich	Blackheath	44.6	35.8	0.80	25
Greenwich	Westhorne Av	41.7	38.7	0.92	9
Greenwich	Burrage	34.8	35.1	0.98	2
Greenwich	Woolwich Flyover	63.9	56.7	0.89	13
Greenwich	Bexley Falconwood	49.5	39.1	0.79	27

London Borough	Site Location	Diffusion Tube	Continuous Analyser	Correction Factor (A)	% Bias based on continuous monitor (B)
Newham	Cam Road	38.4	29.1	0.76	32
Overall % Bias					17.25
Overall Bias Adjustment Factor				0.85	

Discussion of Choice of Factor to Use

In previous years the bias adjustment factor used to adjust the NO_2 diffusion tube raw data has been taken from the co-location study completed at Royal Borough of Kensington and Chelsea AURN/LAQN affiliated site, North Kensington. This has previously been chosen as a Local Factor, rather than using the LWEP or National Bias Adjustment Factor. If the co-location study at HF4 had passed the required QA/QC for bias adjustment it would have been discussed as to whether this factor should have been used.

Due to the poor data capture experienced for the HF4 co-location study, in line with previous years, it has been chosen to use the Local Factor derived from the North Kensington co-location study. The 2018 factor was calculated to be 0.98, previous factors used by Hammersmith & Fulham are presented in Table A.4. The bias adjustment factor used in 2018 is lower than the previous six years, this can be seen within the adjusted diffusion tube monitoring data presented in Table D and Figures G and H.

Table A.4   Bias Adjustment Factors used by Hammersmith & Fulham (2009-2018)

Year	Bias Adjustment Factor
2009	0.92
2010	0.93
2011	0.94
2012	1.01
2013	1.14
2014	1.03
2015	1.07
2016	1.15
2017	1.15
2018	0.98

A.3   Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

In regards to the 2018 diffusion tube data set, annualisation was required at two diffusion tube locations; HF05 and all of the tubes at the triplicate site HF21/22/33, this was due to the data capture at each of diffusion tubes being below 75%. Annualisation has been completed in line with Box 4.9 within LLAQM.TG(16)[1] and full working details are presented in Table A.6. In completing the

annualisation process, data has been taken from a number of automatic monitoring sites that are part of the LAQN/AURN. In line with LLAQM.TG(16)[1] the monitoring sites that have been used lie within a radius of approximately 50 miles of the sites to be annualised and have a data capture of 85% or above.

All monitoring stations that were used are background monitoring stations and as such are not influenced by local sources of air pollution such as road traffic emissions at roadside monitoring sites. The monitoring sites that were used are listed in Table A.5.

Table A.5   LAQN/AURN Monitoring Stations used for Annualisation

Pollutant	Background LAQN/AURN Sites used for Annualisation
NO_2	• North Kensington – Urban Background • Ealing Acton Vale – Urban Background • Wandsworth Putney – Urban Background

Table A.6   Diffusion Tube Short Term to Long Term Monitoring Data Adjustment (2018)

Site ID	Unadjusted Diffusion Tube Mean ($\mu g\ m^{-3}$)	Annualisation Factor North Kensington	Annualisation Factor Ealing Acton Vale	Annualisation Factor Wandsworth Putney	Average Annualisation Factor	Annualised & Bias Adjusted Concentration ($\mu g\ m^{-3}$)
HF05	55.3	0.991	0.969	0.957	1.001	0.980
HF21	62.5	1.114	1.048	1.051	1.113	1.081
HF22	63.5	1.038	1.016	1.057	1.060	1.043
HF23	61.4	1.045	1.008	1.022	1.042	1.029

Distance Adjustment

In line with LLAQM.TG(16)[1] distance correction has been applied to NO_2 monitoring sites that are not sited at locations of relevant exposure as detailed within Table C. The NO_2 Fall-Off with Distance Calculator (v4.2) has been used to predict the NO_2 concentration at a location of relevant exposure; the calculations are presented in Table A.7 below, with the predicted concentrations also presented in Table D and Table B.1.

To complete the NO_2 fall off with distance calculations a background value for each monitoring location is required. Background NO_2 concentrations for 2018 have been derived from the Defra Background Map database that has a current baseline of 2017.

Distance correction has been completed for all Roadside monitoring locations and not the Urban Background locations. In addition distance correction was unable to be completed at Site HF25 due to the monitored NO_2 concentration is higher than the 2018 background concentration.

Table A.7   NO$_2$ Fall-Off with Distance Calculations

Site ID	Distance (m)		Annual Mean Concentration (µg m^{-3})		
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor
HF4	2	8	28.9	71.0	**57.9**
HF01	1	6	25.0	33.1	30.7
HF02	1	6	27.6	46.9	**40.4**
HF03	1	6	22.9	74.3	**56.2**
HF05	2	7	22.8	53.1	**44.6**
HF06	1	6	23.7	45.5	38.1
HF07	1	4	23.7	53.4	**45.5**
HF09	1	6	25.6	42.2	36.7
HF11	5	5	32.7	74.8	<u>**74.8**</u>
HF12	1	6	24.5	32.2	29.9
HF13	3	12	32.7	48.4	**43.5**
HF14	1	4	28.2	51.9	**45.7**
HF15	1	6	27.0	31.1	30.2
HF16	1	6	29.4	51.5	**44.1**
HF17	1	6	25.6	35.3	32.3
HF18	1	6	25.6	49.3	**41.2**
HF19	1	6	25.6	50.1	**41.8**
HF21	2	8	30.7	66.3	**54.7**
HF22	2	8	30.7	64.9	**53.8**
HF23	2	8	30.7	61.9	**51.8**
HF24	1	6	32.7	62.2	**52.3**
HF27	1	4	25.0	39.8	36.1
HF28	1	4	24.5	41.7	37.3
HF29	4.7	7.7	26.5	47.8	**44.9**
HF31	3	8	27.0	68.1	**58.1**
HF33	1	4	27.0	38.7	35.9
HF35	1	6	30.8	47.4	**42.0**
HF36	1	4.73	30.8	54.2	**47.4**
HF37	1	6	20.3	48.3	38.6
HF39	1	6	32.7	69.4	**56.9**
HF40	1	6	32.7	57.1	**49.0**
HF41	1	12	32.7	55.5	**45.1**
HF42	11	20	32.7	50.0	**46.4**

HF43	3	12	32.7	50.6	**44.9**
HF44	3	14	32.7	51.0	**44.5**
HF45	3	13	32.7	47.5	**42.6**

Exceedances of the NO_2 annual mean AQO of 40 µg m^{-3} are shown in **bold**

NO_2 annual means in excess of 60 µg m^{-3}, indicating a potential exceedance of the NO_2 hourly mean AQS objective are shown in **bold** and **<u>underlined</u>**

Appendix B   Full Monthly Diffusion Tube Results for 2018

Table B.1   NO₂ Diffusion Tube Results

| Site ID | Valid data capture for monitoring period % [a] | Valid data capture 2018 % [b] | Annual Mean NO₂ (µg m⁻³) | | | | | | | | | | | | Annual mean – raw data [c] | Annual mean – bias adjusted [c] | Distance corrected to nearest exposure [d] |
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec			
HF01	91.7	91.7	35.8	32.5	34.9	33.7	NR	25.2	32.4	29.1	36.0	33.3	42.3	35.9	33.7	33.1	30.7
HF02	83.3	83.3	46.8	42.9	46.5	NR	47.8	33.5	57.7	51.7	52.9	44.6	54.0	NR	47.8	**46.9**	**40.4**
HF03	100.0	100.0	77.0	58.8	67.5	68.9	77.1	62.8	90.8	89.5	82.2	81.9	80.0	72.8	75.8	<u>74.3</u>	**56.2**
HF04	100.0	100.0	31.4	27.4	37.9	30.5	26.6	21.5	23.2	22.4	24.8	30.3	33.7	28.4	28.1	27.6	-
HF05	66.7	66.7	NR	40.2	NR	53.7	67.7	60.8	60.5	NR	NR	55.2	57.5	46.9	55.3	**53.1**	**44.6**
HF06	100.0	100.0	45.7	43.3	51.6	45.8	51.5	47.2	48.5	44.6	46.0	47.2	43.7	42.4	46.5	**45.5**	38.1
HF07	100.0	100.0	55.1	48.8	53.9	53.6	63.1	20.3	73.9	59.9	58.9	56.4	55.6	54.1	54.5	**53.4**	45.5
HF08	100.0	100.0	31.4	28.9	37.5	26.8	24.7	19.2	21.6	20.1	24.8	31.3	34.7	30.9	27.7	27.1	-
HF09	91.7	91.7	41.9	42.3	NR	44.0	45.0	39.0	44.8	39.3	38.6	44.4	53.4	41.2	43.1	**42.2**	36.7
HF10	100.0	100.0	34.8	32.5	38.9	34.7	32.8	26.6	30.7	26.1	30.2	33.2	37.3	33.7	32.6	32.0	
HF11	91.7	91.7	86.7	62.0	71.3	76.3	86.3	69.4	82.5	NR	73.4	77.3	86.1	68.3	76.3	<u>74.8</u>	<u>74.8</u>
HF12	100.0	100.0	37.9	36.1	34.9	30.4	35.9	29.5	29.4	24.4	27.4	31.4	43.2	33.3	32.8	32.2	29.9
HF13	91.7	91.7	51.3	41.7	43.8	50.9	59.7	45.9	53.9	53.5	57.9	46.1	38.6	NR	49.4	**48.4**	**43.5**
HF14	100.0	100.0	59.2	45.6	54.9	57.6	52.7	39.4	55.8	54.3	55.9	51.6	55.7	52.2	52.9	**51.9**	**45.7**
HF15	100.0	100.0	36.2	30.8	35.8	31.8	36.9	30.9	27.9	24.0	30.3	28.9	30.3	36.5	31.7	31.1	30.2
HF16	100.0	100.0	58.4	46.8	55.1	54.8	56.4	42.7	58.8	56.8	51.4	42.8	54.6	51.3	52.5	**51.5**	**44.1**

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean NO$_2$ (µg m^{-3})												Annual mean – raw data [c]	Annual mean – bias adjusted [c]	Distance corrected to nearest exposure [d]
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec			
HF17	100.0	100.0	38.5	38.6	46.6	36.4	36.1	32.6	33.4	30.9	30.5	34.4	35.2	38.8	36.0	35.3	32.3
HF18	91.7	91.7	58.0	52.8	55.3	53.8	51.9	49.8	52.0	45.6	50.0	47.5	NR	37.2	50.3	**49.3**	**41.2**
HF19	100.0	100.0	53.8	51.6	50.6	56.4	47.0	39.4	54.0	55.3	46.7	54.6	52.2	52.4	51.2	**50.1**	**41.8**
HF20	100.0	100.0	35.1	32.7	38.1	32.0	29.9	22.9	26.6	26.1	29.1	30.8	36.0	31.9	30.9	30.3	-
HF21	100.0	100.0	NR	NR	NR	68.4	65.0	47.4	NR	69.0	62.4	NR	62.9	NR	62.5	<u>66,3</u>	54.7
HF22	100.0	100.0	NR	54.0	58.2	NR	NR	56.4	76.9	68.7	64.8	ST	NR	65.5	63.5	<u>64.9</u>	53.8
HF23	91.7	91.7	NR	55.5	NR	64.3	63.9	56.5	NR	72.6	56.7	64.2	57.5	NR	61.4	<u>61.9</u>	51.8
HF24	91.7	91.7	68.2	58.0	71.0	65.0	69.9	60.5	64.6	58.0	55.1	64.7	67.9	58.2	63.4	<u>62.2</u>	52.3
HF25	75.0	75.0	30.0	26.3	34.4	20.0	26.5	21.0	22.1	20.1	23.3	31.3	33.1	33.0	26.8	26.2	-
HF26	100.0	100.0	36.2	32.0	41.2	29.9	31.3	26.1	24.8	30.0	30.4	ST	31.6	36.5	31.8	31.2	-
HF27	91.7	91.7	46.0	39.4	43.5	41.6	34.1	30.6	44.6	40.2	40.1	ST	45.7	41.0	40.6	39.8	36.1
HF28	100.0	100.0	38.2	38.3	43.6	NR	70.7	31.7	39.1	36.6	NR	ST	45.8	39.1	42.6	**41.7**	37.3
HF29	100.0	100.0	50.5	44.2	52.4	52.1	49.2	33.0	48.7	50.2	54.0	50.4	49.0	51.2	48.7	**47.8**	**44.9**
HF30	100.0	100.0	40.3	39.8	NR	34.1	39.5	27.0	29.9	30.9	30.0	-	41.8	40.1	32.1	31.5	-
HF31	91.7	91.7	61.1	69.7	77.9	70.1	82.9	78.7	70.1	48.3	54.5	86.8	69.9	63.6	69.5	<u>68.1</u>	58.1
HF32	100.0	100.0	45.7	35.7	37.0	37.0	29.4	22.7	32.6	33.5	36.2	25.8	41.9	44.7	35.2	34.5	-
HF33	91.7	91.7	40.4	40.4	42.1	39.0	37.8	34.7	37.9	38.8	37.2	42.1	42.0	42.0	39.5	38.7	35.9
HF34	100.0	100.0	31.4	30.9	34.3	26.6	25.6	20.2	22.6	24.3	NR	29.5	29.6	33.0	28.0	27.4	-
HF35	100.0	100.0	42.1	46.4	55.0	50.7	57.5	49.6	51.0	42.8	39.2	53.5	46.5	46.3	48.4	**47.4**	**42.0**
HF36	91.7	91.7	NR	45.7	54.3	53.2	56.1	49.6	59.9	59.7	57.6	67.1	50.7	54.7	55.3	**54.2**	**47.4**
HF37	100.0	100.0	49.5	51.0	50.3	55.6	50.2	42.0	53.8	47.0	43.7	42.5	54.8	50.8	49.3	**48.3**	38.6

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean NO$_2$ (µg m^{-3})												Annual mean – raw data [c]	Annual mean – bias adjusted [c]	Distance corrected to nearest exposure [d]
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec			
HF38	100.0	100.0	34.2	36.9	39.0	31.4	29.3	25.9	27.1	22.9	26.0	35.0	37.9	36.3	31.8	31.2	-
HF39	100.0	100.0	NR	68.6	57.3	74.5	80.5	73.6	85.7	69.5	63.6	74.8	67.3	63.7	70.8	**<u>69.4</u>**	**56.9**
HF40	91.7	91.7	63.5	54.8	64.9	56.1	67.0	56.5	64.5	51.7	55.9	60.8	49.6	54.3	58.3	**57.1**	**49.0**
HF41	100.0	100.0	59.3	56.4	58.1	51.3	60.1	52.7	62.3	53.6	55.2	57.6	51.2	61.2	56.6	**55.5**	**45.1**
HF42	100.0	100.0	57.9	52.3	52.7	50.5	52.9	40.6	51.1	49.9	52.1	52.3	49.6	50.7	51.1	**50.0**	**46.4**
HF43	100.0	100.0	57.5	54.1	55.0	50.6	52.4	42.8	54.2	50.4	50.4	NR	47.8	53.1	51.7	**50.6**	**44.9**
HF44	100.0	100.0	58.1	51.4	54.9	52.6	52.2	45.0	49.8	49.6	54.0	54.4	47.4	55.6	52.1	**51.0**	**44.5**
HF45	91.7	91.7	53.8	47.6	53.9	48.0	46.9	35.1	50.3	50.7	49.9	50.3	41.4	54.2	48.5	**47.5**	**42.6**

Exceedances of the NO$_2$ annual mean AQO of 40 µg m^{-3} are shown in **bold**

NO$_2$ annual means in excess of 60 µg m^{-3}, indicating a potential exceedance of the NO$_2$ hourly mean AQS objective are shown in **bold** and **<u>underlined</u>**

[a] Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] Data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

[d] Distance corrected to nearest relevant public exposure

NR – No Result